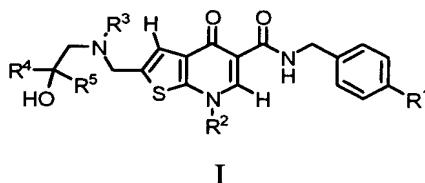


CLAIMS

We claim:

1. A compound of formula I,

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its enantiomeric, diastomeric or tautomeric isomer, or a pharmaceutically acceptable salt thereof wherein,

10 R^1 is

- (a) Cl,
- (b) Br,
- (c) F, or
- (d) CN;

15 R^2 is

- (a) C_{1-4} alkyl optionally substituted by one or more OH or C_{1-4} alkoxy, or
- (b) $(CH_2)_mOCH_2CH_2OH$;

R^3 is C_{1-2} alkyl;

R^4 is a six- (6) membered heteroaryl bonded via a carbon atom having 1, 2, or 3
20 nitrogen atoms, wherein R^4 is optionally fused to a benzene ring, and optionally substituted with one or more R^6 ;

R^5 is

- (a) H, or
- (b) C_{1-2} alkyl optionally substituted by OH;

25 R^6 is

- (a) halo,
- (b) OCF_3 ,
- (c) cyano,
- (d) nitro,
- (e) $CONR^7R^8$,
- (f) NR^7R^8 ,
- (g) C_{1-7} alkyl, which is optionally partially unsaturated and is optionally substituted by one or more R^9 ,

30

(h) $\text{O}(\text{CH}_2\text{CH}_2\text{O})_n\text{R}^{10}$,

(i) OR^{10} , or

(j) CO_2R^{10} ;

R^7 and R^8 are independently

5 (a) H,

(b) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy,

(c) C_{1-7} alkyl which is optionally substituted by one or more OR^{10} , phenyl, or halo substituents,

(d) C_{3-8} cycloalkyl,

10 (e) $(\text{C}=\text{O})\text{R}^{11}$, or

(f) R^7 and R^8 together with the nitrogen to which they are attached form a het, wherein het is a five- (5), or six- (6) membered heterocyclic ring having 1, 2, or 3 heteroatoms selected from the group consisting of oxygen, sulfur, or nitrogen, wherein het is optionally substituted with C_{1-4} alkyl;

15 R^9 is

(a) oxo,

(b) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy,

(c) OR^{10} ,

(d) $\text{O}(\text{CH}_2\text{CH}_2)\text{OR}^{10}$,

20 (e) SR^{10} ,

(f) NR_7R_8 ,

(g) halo,

(h) CO_2R^{10} ,

(i) $\text{CONR}^{10}\text{R}^{10}$, or

25 (j) C_{3-8} cycloalkyl optionally substituted by OR^{10} ;

R^{10} is

(a) H,

(b) C_{1-7} alkyl,

(c) C_{3-8} cycloalkyl, or

30 (d) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy;

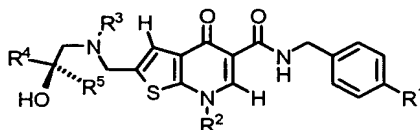
R^{11} is

(a) C_{1-7} alkyl,

(b) C_{3-8} cycloalkyl, or

(c) phenyl optionally substituted by halo, C₁₋₇alkyl, or C₁₋₇alkoxy;
 n is 1, 2, 3, 4 or 5; and
 m is 1 or 2.

2. A compound of claim 1 which is a compound of formula IA



IA.

wherein, R¹, R², R³, R⁴, and R⁵ are as defined according to claim 1.

3. A compound of claim 1 wherein R¹ is chloro.

4. A compound of claim 1 wherein R² is C₁₋₃alkyl.

5. A compound of claim 1 wherein R² is methyl.

6. A compound of claim 1 wherein R² is C₁₋₃alkyl substituted with one or two hydroxy.

7. A compound of claim 1 wherein R² is C₁₋₄alkyl substituted by C₁₋₄alkoxy.

8. A compound of claim 1 wherein R³ is methyl.

9. A compound of claim 1 wherein R³ is ethyl.

10. A compound of claim 1 wherein R⁴ is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) or two (2) nitrogen atoms.

11. A compound of claim 1 wherein R⁴ is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) nitrogen atom.

12. A compound of claims 10 wherein R⁴ is substituted with R⁶.

13. A compound of claim 10 wherein R⁴ is pyridin-2-yl, pyridin-3-yl, pyridin-4-yl, pyrimidin-2-yl, pyridazin-3-yl, or pyrazin-2-yl.
- 5 14. A compound of claim 11 wherein R⁴ is pyridin-2-yl.
15. A compound of claim 13 wherein R⁴ is pyrimidin-2-yl.
16. A compound of claim 13 wherein R⁴ is pyrazin-2-yl.
- 10 17. A compound of claim 12 wherein R⁴ is 6-methylpyridin-2-yl.
18. A compound of claim 1 wherein R⁴ is a six- (6) membered heteroaryl bonded via a carbon atom having one (1) or two (2) nitrogen atoms and is fused to a benzene
15 ring.
19. A compound of claim 18 wherein R⁴ is quinolin-2-yl.
20. A compound of claim 18 wherein R⁴ is substituted by R⁶.
- 20 21. A compound of claim 1 wherein R⁵ is hydrogen.
22. A compound of claim 12 or 20 wherein R⁶ is C₁₋₄alkyl, halo, C₁₋₄alkoxy, trifluoromethyl, or NR⁷R⁸.
- 25 23. A compound of claim 22 wherein R⁶ is methyl.
24. A compound of claim 22 wherein R⁶ is amino.
- 30 25. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier.

26. A method of treating infections by herpesviruses which comprises administering to a mammal in need thereof a compound of claim 1 or 2.

27. The method of claim 26 wherein said herpesviruses is herpes simplex virus types 1, herpes simplex virus types 2, varicella zoster virus, human cytomegalovirus, Epstein-Barr virus, human herpes virus 6, human herpes virus 7 or human herpes virus 8.

28. The method of claim 26 wherein said herpesviruses is human cytomegalovirus.

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29. The method of claim 26 wherein said herpesviruses is varicella zoster virus or Epstein-Barr virus.

30. The method of claim 26 wherein said herpesviruses is herpes simplex virus types 1 or herpes simplex virus types 2.

15

31. The method of claim 26 wherein the compound of claim 1 is administered orally, parenterally or topically.

32. The method of claim 26 wherein the compound of claim 1 is in an amount of from about 0.1 to about 300 mg/kg of body weight.

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33. The method of claim 26 wherein the compound of claim 1 is in an amount of from about 1 to about 30 mg/kg of body weight.

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34. The method of claim 26 wherein said mammal is a human.

35. The method of claim 26 wherein said mammal is an animal.

36. A method of treating atherosclerosis and restenosis comprising administering to a mammal in need thereof a compound of claim 1 or 2.

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37. A method for inhibiting a herpesviral DNA polymerase, comprising contacting the polymerase with an effective inhibitory amount of a compound of claim 1.

38. A compound of formula I, or a pharmaceutically acceptable salt thereof, for use in the manufacture of medicines for the treatment or prevention of a herpesviral infection in a mammal.

39. A compound of claim 1 which is

- (1) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (2) (+)-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (3) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-4-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (4) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (5) (+)-*N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (6) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-(6-methylpyridin-2-yl)ethyl)—(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (7) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-quinolin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (8) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (9) *N*-(4-chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (10) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (11) *N*-(4-Chlorobenzyl)-2-((((2*R*)-2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (12) *N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridazin-3-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,

- (13) *rac-N*-(4-chlorobenzyl)-7-ethyl-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (14) *rac-N*-(4-chlorobenzyl)-7-ethyl-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- 5 (15) *rac-N*-(4-chlorobenzyl)-7-propyl-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methyl)-amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (16) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-4-oxo-7-propyl-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (17) *N*-(4-chlorobenzyl)-7-(2,3-dihydroxypropyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-
10 carboxamide,
- (18) *N*-(4-chlorobenzyl)-7-(3-hydroxypropyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- 15 (19) *rac-N*-(4-chlorobenzyl)-7-(3-hydroxypropyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (20) *N*-(4-chlorobenzyl)-7-(2-hydroxyethyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)methyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-
20 carboxamide,
- (21) *rac-N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-7-(2-methoxyethyl)-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (22) *N*-(4-Chlorobenzyl)-2-(((2*R*)-2-hydroxy-2-pyrazin-2-ylethyl)(methyl)amino)-methyl)-4-oxo-7-(2-(2-(tetrahydro-2*H*-pyran-2-yloxy)ethoxy)ethyl)-4,7-dihydro-
25 thieno[2,3-*b*]pyridine-5-carboxamide,
- (23) *N*-(4-fluorobenzyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- (24) *N*-(4-cyanobenzyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide,
- 30 (25) *N*-(4-bromobenzyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methyl)amino)-methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]pyridine-5-carboxamide, and a pharmaceutically acceptable salt thereof.

40. A compound of claim 39 which is *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyridin-2-ylethyl)(methylamino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

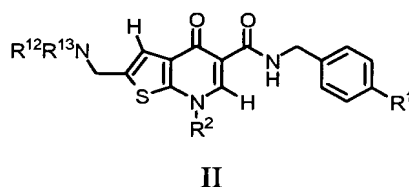
5 41. A compound of claim 39 which is (+)-*N*-(4-chlorobenzyl)-2-(((2*R*)-2-hydroxy-2-pyridin-2-ylethyl)(methylamino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide or a pharmaceutically acceptable salt thereof.

42. A compound of claim 39 which is *rac*-*N*-(4-chlorobenzyl)-2-(((2-hydroxy-2-pyrimidin-2-ylethyl)(methylamino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide, or a pharmaceutically acceptable salt thereof.

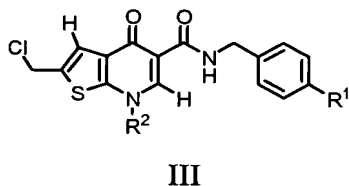
43. A compound of claim 39 which is *N*-(4-chlorobenzyl)-2-(((2*R*)-2-hydroxy-2-pyrimidin-2-ylethyl)(methylamino)methyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-*b*]-pyridine-5-carboxamide, or a pharmaceutically acceptable salt thereof.

44. A method for preparing a compound of formula (I) according to claim 1 comprising:

(a) reacting an amine of a formula II,



25 with ethylchloroformate to produce a compound of the formula III,



30 and (b) reacting a compound of formula III with an amino alcohol of the formula $R^4R^5C(OH)CH_2NH(R^3)$ in the presence of an inorganic or tertiary amine base; wherein,

R¹ is

- (a) Cl,
- (b) Br,
- (c) F, or
- 5 (d) CN;

R² is

- (a) C₁₋₄alkyl optionally substituted by one or more OH or C₁₋₄alkoxy, or
- (b) (CH₂)_mOCH₂CH₂OH;

R³ is C₁₋₂alkyl;

- 10 R⁴ is a six- (6) membered heteroaryl bonded via a carbon atom having 1, 2, or 3 nitrogen atoms, wherein R⁴ is optionally fused to a benzene ring, and optionally substituted with one or more R⁶;

R⁵ is

- (a) H, or
- 15 (b) C₁₋₂alkyl optionally substituted by OH;

R⁶ is

- (a) halo,
- (b) OCF₃,
- (c) cyano,
- 20 (d) nitro,
- (e) CONR⁷R⁸,
- (f) NR⁷R⁸,
- (g) C₁₋₇alkyl, which is optionally partially unsaturated and is optionally substituted by one or more R⁹,
- 25 (h) O(CH₂CH₂O)_nR¹⁰,
- (i) OR¹⁰, or
- (j) CO₂R¹⁰;

R⁷ and R⁸ are independently

- (a) H,
- 30 (b) phenyl optionally substituted by halo, C₁₋₇alkyl, or C₁₋₇alkoxy,
- (c) C₁₋₇alkyl which is optionally substituted by one or more OR¹⁰, phenyl, or halo substituents,
- (d) C₃₋₈cycloalkyl,

(e) $(C=O)R^{11}$, or

(f) R^7 and R^8 together with the nitrogen to which they are attached form a het, wherein het is a five- (5), or six- (6) membered heterocyclic ring having 1, 2, or 3 heteroatoms selected from the group consisting of oxygen, sulfur, or nitrogen, wherein
 5 het is optionally substituted with C_{1-4} alkyl;

R^9 is

- (a) oxo,
- (b) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy,
- (c) OR^{10} ,
- 10 (d) $O(CH_2CH_2)OR^{10}$,
- (e) SR^{10} ,
- (f) NR_7R_8 ,
- (g) halo,
- (h) CO_2R^{10} ,
- 15 (i) $CONR^{10}R^{10}$, or
- (j) C_{3-8} cycloalkyl optionally substituted by OR^{10} ;

R^{10} is

- (a) H,
- (b) C_{1-7} alkyl,
- 20 (c) C_{3-8} cycloalkyl, or
- (d) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy;

R^{11} is

- (a) C_{1-7} alkyl,
- (b) C_{3-8} cycloalkyl, or
- 25 (c) phenyl optionally substituted by halo, C_{1-7} alkyl, or C_{1-7} alkoxy;

R^{12} and R^{13} are independently C_{1-7} alkyl, or R^{12} and R^{13} together with the nitrogen to which they are attached form morpholine, pyrrolidine, or piperidine;

n is 1, 2, 3, 4 or 5; and

m is 1 or 2.

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45. A method according to claim 44 wherein R^{12} and R^{13} together with the nitrogen to which they are attached form morpholine.

46. A method according to claim 44 wherein R^{12} and R^{13} are independently methyl.

47. A method according to claim 44 wherein R^1 is chloro, R^2 and R^3 are independently methyl, R^4 is pyridin-2-yl, and R^5 is hydrogen.

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48. A method according to claim 44 wherein R^1 is chloro, R^2 and R^3 are methyl, R^4 is pyrimidin-2-yl, and R^5 is hydrogen.

49. *N*-(4-Chlorobenzyl)-2-(chloromethyl)-7-methyl-4-oxo-4,7-dihydrothieno[2,3-
10 *b*]pyridine-5-carboxamide.